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Class 526  
5 1. A method for making a biomaterial, said method comprising combining two or more precursor components of said biomaterial under conditions that allow polymerization of the two components, wherein said polymerization occurs through self selective reaction between a strong nucleophile and a conjugated unsaturated bond or a conjugated unsaturated group, by nucleophilic addition, wherein the functionality of each component is at least two, and wherein said biomaterial does not comprise unprocessed albumin, and said unsaturated bond or group is not a maleimide or a vinyl sulfone.

8.02  
10 2. The method of claim 1, wherein said components are selected from the group consisting of oligomers, polymers, biosynthetic proteins or peptides, naturally occurring peptides or proteins, processed naturally occurring peptides or proteins, and polysaccharides. *starting monomer*

3. The method of claim 2, wherein said components are functionalized to comprise a strong nucleophile or a conjugated unsaturated group or a conjugated unsaturated bond. *8.31.03*  
*↓*  
*PGG*  
*PIACAYLAC*

15 4. The method of claim 1, wherein said strong nucleophile is selected from the group consisting of a thiol or a group containing a thiol.

8.01  
20 5. A method for making a biomaterial, said method comprising combining two or more precursor components of said biomaterial under conditions that allow polymerization of the two components, wherein said polymerization occurs through self selective reaction between an amine and a conjugated unsaturated bond or a conjugated unsaturated group, by nucleophilic addition, wherein the functionality of each component is at least two, and wherein said biomaterial does not comprise unprocessed albumin, and

said unsaturated bond or group is not a maleimide or a vinyl sulfone.

8.02 6. The method of claim 1, wherein said conjugated unsaturated group is an acrylate, an acrylamide, a quinone, or 2- or 4-vinylpyridinium.

8.02 7. The method of claim 2, wherein said polymer is selected from the group consisting of poly(ethylene glycol), poly(ethylene oxide), poly(vinyl alcohol), poly(ethylene-co-vinyl alcohol), poly(acrylic acid), poly(ethylene-co-acrylic acid), poly(ethyloxazoline), poly(vinyl pyrrolidone), poly(ethylene-co-vinyl pyrrolidone), poly(maleic acid), poly(ethylene-co-maleic acid), poly(acrylamide), and poly(ethylene oxide)-co-poly(propylene oxide) block copolymers.

10.02 8. The method of claim 1, wherein one <sup>of</sup> said component has a functionality of at least three.

8.02 (1) 9.10 (2) 5, 6, 1 elect one ultimate site  
9. The method of claim 2, wherein said peptide comprises an adhesion site, growth factor binding site, or protease binding site.

10. The method of claim 1, further comprising combining said precursor components with a molecule that comprises an adhesion site, a growth factor binding site, or a heparin binding site and also comprises either a strong nucleophile or a conjugated unsaturated bond or a conjugated unsaturated group.

11. The method of claim 10, wherein said strong nucleophile is a thiol or said conjugated unsaturated bond or conjugated unsaturated group is an acrylate, an acrylamide, a quinone, or a vinyl pyridinium.

12. The method of claim 1, wherein said biomaterial is a hydrogel.

13. The method of claim 1, wherein said biomaterial is degradable.

14. The method of claim 1, wherein said biomaterial is made in the presence of sensitive biological molecules.

5 15. The method of claim 1, wherein said biomaterial is made in the presence of cells or tissues.

16. The method of claim 1, wherein said biomaterial is made within or upon the body of an animal.

10 17. The method of claim 1, further comprising combining said precursor components with an accelerator prior to polymerization.

18. The method of claim 1, further comprising mixing said precursor components with a component that comprises at least one conjugated unsaturated bond or conjugated unsaturated group and at least one amine reactive group.

15 19. The method of claim 15, further comprising applying an additional component to the cell or tissue surface, the additional component comprising at least one conjugated unsaturated bond or conjugated unsaturated group and at least one amine reactive group.

20. A biomaterial formed by combining two or more precursor components of a biomaterial under conditions that allow polymerization of the two components, wherein

said polymerization occurs through self selective reaction between a strong nucleophile and a conjugated unsaturated bond or a conjugated unsaturated group, by nucleophilic addition, wherein the functionality of each component is at least two, said biomaterial does not comprise unprocessed albumin, and said unsaturated bond or group is not a maleimide or a vinyl sulfone.

21. The biomaterial of claim 20, wherein said component is selected from the group consisting of oligomers, polymers, biosynthetic proteins or peptides, naturally occurring peptides or proteins, processed naturally occurring peptides or proteins, and polysaccharides.

22. The biomaterial of claim 21, wherein said components are functionalized to comprise a strong nucleophile or a conjugated unsaturated bond or a conjugated unsaturated group.

23. The biomaterial of claim 20, wherein said strong nucleophile is selected from the group consisting of a thiol, or a group containing a thiol.

24. A biomaterial formed by combining two or more precursor components of a biomaterial under conditions that allow polymerization of the two components, wherein said polymerization occurs through self selective reaction between an amine and a conjugated unsaturated bond or a conjugated unsaturated group, by nucleophilic addition, wherein the functionality of each component is at least two, said biomaterial does not comprise unprocessed albumin, and said unsaturated bond or group is not a maleimide or a vinyl sulfone.

25. The biomaterial of claim 20, wherein said unsaturated group is an acrylate, an acrylamide, a quinone, or a vinylpyridinium.

26. The biomaterial of claim 21, wherein said polymer is selected from the group consisting of poly(ethylene glycol), poly(ethylene oxide), poly(vinyl alcohol), poly(ethylene-co-vinyl alcohol), poly(acrylic acid), poly(ethylene-co-acrylic acid), poly(ethyloxazoline), poly(vinyl pyrrolidone), poly(ethylene-co-vinyl pyrrolidone), poly(maleic acid), poly(ethylene-co-maleic acid), poly(acrylamide), and poly(ethylene oxide)-co-poly(propylene oxide) block copolymers.

27. The biomaterial of claim 20, wherein one said component has a functionality of at least three.

28. The biomaterial of claim 21, wherein said peptide comprises an adhesion site, growth factor binding site, or protease binding site.

29. The biomaterial of claim 20, further comprising a molecule that comprises an adhesion site, a growth factor binding site, or a heparin binding site and also comprises either a strong nucleophile or a conjugated unsaturated bond or a conjugated unsaturated group.

30. The method of claim 29, wherein said strong nucleophile is a thiol or said conjugated unsaturated bond or conjugated unsaturated group is an acrylate, a quinone, or a vinyl pyridinium.

31. The biomaterial of claim 20, wherein said biomaterial is a hydrogel.

32. The biomaterial of claim 20, wherein said biomaterial is degradable.

33. The biomaterial of claim 20, wherein said biomaterial is made in the presence of sensitive biological molecules.

34. The biomaterial of claim 20, wherein said biomaterial is made in the presence of cells or tissues.

35. The biomaterial of claim 20, wherein said biomaterial is made within or upon the body of an animal.

36. The biomaterial of claim 20, further comprising an accelerator.

37. The biomaterial of claim 20, further comprising a component that comprises at least one conjugated unsaturated bond or conjugated unsaturated group and a least one amine reactive group.

38. The biomaterial of claim 34, further comprising an additional component coupled to the cell or tissue surface, the additional component comprising at least one conjugated unsaturated bond or conjugated unsaturated group and being coupled to the cell or tissue surface via by reaction of at least one amine reactive group.

39. A method for delivering a therapeutic substance to a cell, tissue, organ, organ system, or body of an animal said method comprising the steps of contacting said cell, tissue, organ, organ system or body with the biomaterial of claim 20 or 24, wherein said biomaterial contains a therapeutic substance, whereby said therapeutic substance is

delivered to said cell, tissue, organ, organ system, or body of an animal.

40. The method of claim 39, wherein said therapeutic substance is selected from the group consisting of proteins, naturally occurring or synthetic organic molecules, viral particles, and nucleic acid molecules.

5 41. The method of claim 39, wherein said therapeutic substance is a prodrug.

42. The method of claim 40, wherein said nucleic acid molecule is DNA or RNA.

43. The method of claim 40, wherein said nucleic acid molecule is an antisense nucleic acid molecule.

10 44. A method of regenerating a tissue, said method comprising introducing a scaffold to a site, under conditions which permit cell ingrowth, said scaffold comprising the biomaterial of claim 20 or 24.

45. The method of claim 44, wherein said scaffold has been pre-seeded with cells.

46. The method of claim 44, wherein said tissue is selected from the group consisting of bone, skin, nerve, blood vessel, and cartilage.

15 47. A method of preventing adhesions, thrombosis, or restenosis, said method comprising the steps of contacting a site with the biomaterial precursor components of claim 20 or 24; and polymerizing said components at said site.

48. A method of sealing a fluid or gas flow, said method comprising the steps of contacting a site within the body of an animal with the biomaterial precursor components of claim 20, 24, or 37; and polymerizing said components at said site.

49. The method of claim 48, wherein said site is a lung, blood vessel, skin, dura barrier, and intestine.

50. A method of encapsulating a cell or tissue, said method comprising the steps of combining the precursor components of a biomaterial with a cell or tissue; and polymerizing said components, wherein said polymerization occurs through self selected reaction between a strong nucleophile and a conjugated or a conjugate unsaturated group, unsaturated bond, and wherein said cell or tissue is encapsulated by said polymerized biomaterial.